

**We claim:**

1. A process for the preparation of semi-conducting polymer film containing beta crystalline phase of polyvinylidene fluoride, the process comprising forming a solution by dissolving polyvinylidene fluoride in a solvent, dispersing conducting particles therein, casting the dispersed solution on a substrate, evaporating the solvent, drying the film, holding the film between two metal plates and applying an electric potential thereto, removing the film to obtain a polymer film containing high beta crystalline phase of polyvinylidene fluoride.
2. A process as claimed in claim 1 wherein the polyvinylidene fluoride used has an ethylene content of less than 2 %.
3. A process as claimed in claim 1 wherein the solvent used for dissolving and casting the film has an amide substituted group and has dielectric constant between 20 to 45.
4. A process as claimed in claim 1 wherein the conducting particles added to the solution have a particle size in the range of 0.1 to 20 micrometers and concentration in the range of 2 to 50 % by weight of the polymer.
2. A process as claimed in claim 4, wherein the concentration of the conducting particles ranges from 3 % to 30%.
3. A process as claimed in claim 4, wherein the concentration of the conducting particles is 20% by weight of the polymer.
5. A process as claimed in claim 1 wherein the conducting particles have a conductivity in the range of  $10^{-3}$  to  $10^{-4}$  S/cm.
6. A process as claimed in claim 1 wherein the polymer film is cast in stainless steel dish at a temperature in the range of 45° to 90°C.
7. A process as claimed in claim 1 wherein the electric potential used for treatment is in the range of 10 V to 100 V.
8. A process as claimed in claim 1 wherein the electric potential is applied by holding the film between two metal plates and for a duration of 10 to 300 min.
9. A process as claimed in claim 1 wherein the duration of application is 60 minutes.
10. A process as claimed in claim 1 wherein the temperature used for conditioning is in the range of 40°C to 100°C.
11. A process as claimed in claim 1 wherein the temperature used for conditioning is 80°C.
12. A process as claimed in claim 1 wherein the film is cast by spin coating on smooth substrates and metal electrodes are deposited on both sides of the film to form a device directly containing the beta crystalline phase of polyvinylidene fluoride.